

Application No. 10/064,791
Docket No. 13DV-13975
Amendment dated February 22, 2005
Reply to Office Action of November 22, 2004

REMARKS

In the Office Action, the Examiner reviewed claims 26-40 of the above-identified US Patent Application, with the result that claims 26-40 were rejected under the judicially-created doctrine of obviousness-type double patenting in view of commonly-assigned U.S. Patent No. 6,808,799 to Darolia et al. (Darolia), claims 26-40 were rejected under 35 USC §102 in view of U.S. Patent No. 6,312,832 to Alperine et al. (Alperine), and claims 26-30, 32, 39, and 40 were rejected under 35 USC §102 in view of Japanese Kokai Patent Application No. 2-301550 to Harada. In response, Applicants have amended the specification and claims as set forth above. More particularly:

Independent claims 26 and 34 have been amended to specify that elemental carbon and insoluble gas are both entrapped within pores (32), the pores (32) are closed by sintering, and the elemental carbon is in the form of clusters. Support for these amendments can be found in Applicants' specification at paragraphs [0011] (sintering) and [0010] (clusters).

Dependent claims 27 and 36 have been amended to recite that at least some of the pores closed by sintering entrap clusters of carbides. Support for this amendment can be found in Applicants' specification at paragraph [0010].

Dependent claims 28 and 38 have been amended to recite that at

Application No. 10/064,791
Docket No. 13DV-13975
Amendment dated February 22, 2005
Reply to Office Action of November 22, 2004

least some of the pores closed by sintering entrap sulfur dioxide gas and/or nitrogen gas. Support for this amendment can be found in claim 29 as filed.

Dependent claim 29 has been amended to depend from claim 26, and claims 29 and 37 have been amended to limit the list of insoluble gases to carbon monoxide and carbon dioxide.

Dependent claim 30 has been amended to recite that at least some of the pores closed by sintering entrap sulfur dioxide, nitrogen, and/or argon. Support for this amendment can be found in claim 29 as filed.

Dependent claim 35 has been amended to specify that the thermal-insulating material consists of yttria-stabilized zirconia.

Claims 33, 39, and 40 have been canceled.

Applicants believe that the above amendments do not present new matter. Favorable reconsideration and allowance of remaining claims 26-32 and 34-38 are respectfully requested in view of the above amendments and the following remarks.

Double Patenting Rejection

The Examiner rejected remaining claims 26-32 and 34-38 under the judicially-created doctrine of obviousness-type double patenting as being unpatentable over claims 1-15 of Darolia. Applicants hereby acknowledge that

Application No. 10/064,791
Docket No. 13DV-13975
Amendment dated February 22, 2005
Reply to Office Action of November 22, 2004

the present application and Darolia are commonly assigned.

Under MPEP §804, Section II.B.1.(a), if Applicants' claims can be shown to be unobvious over the claims cited from Darolia, issuance of a patent covering Applicants' claims would not result in an unjustified timewise extension of the right to exclude - the public policy that serves as the basis for judicially-created doctrine of obviousness-type double patenting rejections.

Applicants' independent claims 26 and 34 require a TBC (26) that contains carbon-containing clusters and an insoluble gas entrapped within pores (32) (formed as a result of a shadowing effect by the clusters during deposition of the TBC 26) that are closed by sintering. Applicants believe that their claimed TBC is not obvious over the TBC defined by the claims of Darolia when evaluated according to MPEP §804, Section II.B.1., which states that

When considering whether the invention defined in a claim of an application is an obvious variation of the invention defined in the claim of a patent [or copending application], *the disclosure of the patent [or copending application] may not be used as prior art.* (Emphasis added).

The claims of Darolia disclose a TBC comprising a thermal-insulating material that, in addition to being alloyed with at least a third oxide, contains elemental carbon, carbides, oxycarbides and/or a carbon-containing gas entrapped within pores. However, Darolia's claims do not disclose or suggest Applicants'

Application No. 10/064,791
Docket No. 13DV-13975
Amendment dated February 22, 2005
Reply to Office Action of November 22, 2004

sintered TBC, whereby closed pores are intentionally closed as a result of a heat treatment. Therefore, Applicants believe that their claims are not obvious in view of Darolia's claims, and respectfully request withdrawal of the judicially-created double patenting rejection of Applicants' claims in view of Darolia.

Rejections under 35 USC §102

Remaining claims 26-32 and 34-38 were also rejected under 35 USC §102 as being anticipated by Alperine and/or Harada. Applicants respectfully request reconsideration of these rejections in view of the following comments.

As noted above, Applicants' invention is directed to a TBC (26) that contains carbon-containing clusters and an insoluble gas entrapped within pores (32) that were formed as a result of a shadowing effect by the clusters during deposition of the TBC 26 and subsequently closed by sintering. For this purpose, the TBC 26 is formed by co-depositing elemental carbon and the thermal-insulating (ceramic) material of the TBC by EBPVD (paragraph [0010]), and thereafter intentionally undergoes a heat treatment (e.g., at 950°C or more; paragraph [0028]) to close at least some of the porosity. The carbon-containing clusters are preferably deposited by evaporating an ingot containing graphite or a carbide compound (paragraph [0022]).

While Alperine discloses an EBPVD process that co-deposits carbon

Application No. 10/064,791
Docket No. 13DV-13975
Amendment dated February 22, 2005
Reply to Office Action of November 22, 2004

and a ceramic material to form a TBC, the source of the carbon is said to be carbonized residue of an organic carbon-rich solvent used as a binder for the powder for the ceramic material. Alperine does not disclose that evaporation of the residue leads to the deposition of carbon clusters capable of producing a shadowing effect that forms porosity, and Alperine does not disclose sintering the TBC after deposition to form closed porosity that entraps the carbon deposited by Alperine's method. Therefore, Applicants believe that Alperine does not teach or suggest their claimed TBC, and respectfully request withdrawal of the rejection of the claims based on Alperine.

Harada discloses a HIP treatment to close some of the numerous pores present in a plasma-sprayed TBC. The HIP treatment can be performed in an argon atmosphere while the coating is packed in a carbon powder. However, Harada's process is not disclosed as being capable of depositing carbon within the TBC, nor is it apparent how carbon would be deposited using Harada's process. Finally, it is worth noting that it is well known in the art that a plasma-sprayed TBC is formed by heat-softened particles deposited as "splats," yielding a TBC with a degree of inhomogeneity and porosity that is completely different from a TBC having a columnar microstructure.

For the above reasons, Applicants also believe that Harada does not teach or suggest their TBC, and therefore respectfully request withdrawal of the


Application No. 10/064,791
Docket No. 13DV-13975
Amendment dated February 22, 2005
Reply to Office Action of November 22, 2004

rejection of the claims based on Harada.

Closing

Applicants respectfully request that their patent application be given favorable reconsideration. Should the Examiner have any questions with respect to any matter now of record, Applicants' representative may be reached at (219) 462-4999.

Respectfully submitted,

By 
Domenica N.S. Hartman
Reg. No. 32,701

February 22, 2005
Hartman & Hartman, P.C.
Valparaiso, Indiana 46383
TEL.: (219) 462-4999
FAX: (219) 464-1166